

CLAIMS

What is claimed is:

1. A tire inflation system for a wheel end assembly comprising:
an input operably coupled to a driving power source;
an output driven by said input, said output including a wheel shaft coupled to a wheel hub for rotation about a wheel axis wherein said wheel shaft includes a laterally extending bore having a first end in fluid communication with an air source and a second end in fluid communication with a tire assembly mounted for rotation with said wheel hub; and
a seal assembly cooperating with said first end of said bore to provide a sealed air flow path extending from the air source, through said bore, and to the tire assembly.
2. The system set forth in claim 1 wherein said wheel shaft includes a first end face defining a fluid inlet in communication with the air source and a second end face defining a fluid outlet in communication with the tire assembly, said laterally extending bore extending through the entire length of said wheel shaft from said first end face to said second end face.
3. The system set forth in claim 2 wherein said laterally extending bore is parallel to said wheel axis.
4. The system set forth in claim 2 wherein said fluid inlet and said fluid outlet are coaxial with said bore.

5. The system set forth in claim 2 including an air supply component having a base member in fluid communication with the air supply and mounted to a non-rotating wheel component and an air conduit extending from said base member, through said seal assembly, and into said bore.

6. The system set forth in claim 5 wherein said seal assembly includes a resilient gland seal received within said bore and mounted for rotation with said wheel shaft, a gland nut attached to said first end face of said wheel shaft and defining an internal nut bore wherein said air conduit extends through said nut bore and is engaged by said gland seal to define a seal interface.

7. The system set forth in claim 5 wherein said wheel shaft includes a secondary bore at said first end face, said secondary bore having a greater diameter than said laterally extending bore and wherein seal assembly includes a seal body defining an internal seal bore, at least one internal seal received within said seal bore, and at least one external seal surrounding an external surface of said seal body, said seal body being mounted within said secondary bore with said air conduit extending through said seal bore to sealingly engage said internal seal.

8. The system set forth in claim 7 wherein said seal body includes a channel formed around said external surface to receive said external seal and establish sealing engagement between said seal body and said secondary bore and wherein said at least one internal seal comprises first and second o-rings mounted within first and second grooves formed within

said internal seal bore, said first and second o-rings being positioned on opposite sides of said external seal.

9. The system set forth in claim 5 wherein said seal assembly includes a tube mounted at said first end face for rotation with said wheel shaft and at least one resilient seal received within said tube, said air conduit extending through said tube to sealing engage said seal.

10. The system set forth in claim 1 wherein said input comprises an axle shaft defining an axle shaft axis of rotation that is parallel to and spaced apart from said wheel axis.

11. A tire inflation system for a drive axle comprising:

an input coupled to a driving power source and defining a longitudinal axis;

first and second wheel shafts driven by said input and defining a wheel axis that is transverse to said longitudinal axis;

first and second wheel hubs driven by said first and second wheel shafts for rotation about said wheel axis, said first and second wheel hubs each supporting a tire assembly wherein each of said first and second wheel shafts comprises a cylindrical shaft body having a first end face and a second end face with a fluid passage extending through the length of said shaft body from said first end face to said second end face to define a fluid inlet in fluid communication with an air supply at said first end face and a fluid outlet in fluid communication with the tire assembly at said second end face; and

first and second seal assemblies cooperating with said first end faces of said first and second wheel shafts to provide a sealed air flow path extending from the air supply, through said fluid passage, and to the tire assemblies.

12. The system of claim 11 wherein each of said first and second wheel shafts includes an air supply component mounted to a non-rotating axle component, said air supply component including a base member in fluid communication with the air supply and an air conduit extending from said base member, through said seal assembly, and into said fluid passage.

13. The system of claim 12 wherein said first and second wheel shafts each include a bore formed at said first end face, said bore being concentric with said fluid passage and having a greater diameter than said fluid passage and wherein said first and second seal assemblies each include a seal support member mounted at least partially within said bore for rotation with said respective wheel shaft and at least one resilient seal member cooperating with said seal support member to sealingly engage said air conduit.

14. The system of claim 13 wherein said input comprises a first axle shaft operably coupled to drive said first wheel shaft and a second axle shaft operably coupled to drive said second wheel shaft, said first and second axle shafts defining an axle shaft axis of rotation that is parallel to and spaced apart from said wheel axes with said fluid passages being parallel to said wheel axes.

15. The system of claim 14 wherein said fluid inlet and fluid outlet are coaxial with said fluid passage.

16. A tire inflation system for a portal drive axle comprising:
- an input coupled to a driving power source and defining a longitudinal axis;
 - a differential driven by said input;
 - first and second axle shafts operably coupled to said differential and defining an axle axis that is transverse to said longitudinal axis;
 - first and second wheel gear sets driven by said first and second axle shafts;
 - first and second wheel shafts driven by said first and second wheel gear sets, said first and second wheel shafts defining a wheel axis that is transverse to said longitudinal axis, and parallel to and spaced apart from said axle axis;
 - first and second wheel hubs driven by said first and second wheel shafts for rotation about said wheel axis, said first and second wheel hubs each supporting a tire assembly wherein each of said first and second wheel shafts includes an internally formed fluid passage having a fluid inlet in fluid communication with an air supply and a fluid outlet in fluid communication with the tire assembly; and
 - first and second seal assemblies cooperating with said fluid inlets of said first and second wheel shafts to provide a sealed air flow path extending from the air supply, through said fluid passage, and to the tire assemblies.
17. The system of claim 16 wherein said wheel axis is vertically higher relative to ground level than said axle axis.
18. The system of claim 17 wherein one of said first and second axle shafts is substantially longer than the other of said first and second axle shafts.

19. The system of claim 16 wherein said first and second wheel shafts each comprise a cylindrical shaft body having a first end face and a second end face with said fluid passage extending through the length of said shaft body from said first end face to said second end face to define said fluid inlet at each of said first end faces and said fluid outlet at each of said second end faces.

20. The system of claim 19 wherein each of said first and second wheel shafts includes an air supply component mounted to a non-rotating axle component, said air supply component including a base member in fluid communication with the air supply and an air conduit extending from said base member, through said seal assembly, and into said fluid passage.